



## **Relationships between clay mineralogy and paleo-environments, the central part of the Tertiary Sivas Basin, Turkey**

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Sivas basin is the one of Central Anatolian Basins occurred after the closure of the northern branch of Neotethys in the uppermost of Cretaceous. Sivas basin sediments contain marine and continental sequences having from Cretaceous to Pliocene ages. In this study, the relationship between paleo-environments and clay mineralogy has been investigated by means of optical microscopic, XRD and geochemical methods. Paleocene is represented by red colored siliciclastic and carbonate rocks such as ophiolitic conglomerate, sandstone, siltstone, claystone, marl and limestone and characterized by a shallow marine environment. These lithologies contain phyllosilicates (smectite, chlorite, serpentine, talc, I-S, C-S, illite), calcite, dolomite, quartz and feldspar, in order of abundance. Eocene includes an alternation of volcanogenic sandstone-shale-limestone with rare gypsum intercalations that is deposited in the open sea. Clay (C-S, illite, chlorite), calcite, quartz and feldspar are the main minerals in this period. Oligo-Miocene sequence in the central part of the Sivas basin was deposited in three different environments as open sea, lagoon and lake based on the geologic mapping and biostratigraphic data. An association of clay (smectite  $\pm$  illite or  $\pm$  I-S) + calcite  $\pm$  quartz  $\pm$  feldspar is present in the marls of the open marine environment. In the lagoon environment sediments with lateral transition to each others are subdivided into two levels. Siltstone and sandstones representing lower levels contain clay + calcite + feldspar + quartz  $\pm$  analcime. However, the upper level is characterized by clay (smectite  $\pm$  illite  $\pm$  I-S  $\pm$  chlorite) + gypsum + calcite  $\pm$  quartz  $\pm$  opal-CT  $\pm$  feldspar in the clay laminated gypsums and gypsum-bearing marls and calcite + clay (kaolinite + smectite

$\pm$  I-S  $\pm$  illite)  $\pm$  quartz  $\pm$  feldspar  $\pm$  gypsum in the marls rich in organic material. The assemblages of smectite + palygorskite  $\pm$  illite  $\pm$  chlorite  $\pm$  I-S and C-S) + dolomite and/or calcite + feldspar + quartz are recognized in the lacustrine marls. Environments as open marine, lagoon and lacustrine are dominated by diagenetic mineral suites such as smectite and calcite; gypsum, calcite, smectite and kaolinite; and dolomite, palygorskite and smectite, respectively. Units with similar appearances in the basin in which Miocene units could not only distinguished by lateral and vertical facies changes but also clay mineral associations from Early Tertiary units.